Intravenous Barbiturate Anesthesia

by

N. I. Truten'

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INTRAVENOUS BARBITURATE ANESTHESIA

N. I. Truten'

From the ~~department~~ Chair F X of ~~facultative~~ surgery of the Khar'kov ~~Kharvok~~ medical institute

Director - Professor A. Z. Tseytlin

While definite advances have been made in the study of anesthesia and narcosis in recent times, anesthetization is still a real problem today.

For this reason, we would like to share our observations over the last three and one-half years which have to do with ~~internal anesthesia using primary~~ intravenous narcosis using the principal derivatives of barbituric acid, employed in our clinic, namely: hexenal, pentothal, hexanastab and evipan.

The basic positive characteristic of barbiturates is that they do not cause excitement in patients, not only while they are falling asleep, but also during the awakening period, which is explained by their action on the hypothalmus. In just a few seconds after the injection of the first portion of these substances, there ~~appears~~ sets in a soft, quiet sleep, followed very quickly by a full relaxation of the trunk and extremity musculature. The pulse and respiration, which increase a little at the outset, presently become steady without any sharp variations. Vomiting and other similar effects, usually caused by other forms of anesthesia, are absent.

However, barbiturates also have their negative properties, which should always be kept in mind. The most important of these negative properties, that should be considered, is their inhibi-

tory action on the respiratory center, and some individual reactivity to the injection of these preparations, which is especially apparent in children and old people, and also in ~~radically~~ strongly exhausted subjects and patients with pathology of the respiratory organs or liver. This should not only put one on guard against the fast injection of large doses, but often presents a definite counter-indication against the use of barbiturates.

On the basis of our observations we think it wise to alternate injections of barbiturates and forty percent glucose, which allows a more normal course of anesthesia, improving the general condition of the patient, and guarantees the absence of certain complications, which are sometimes possible with the administration of these substances.

At first we gave barbiturates only in short operations (not more than thirty to forty minutes), but later we also used this form of anesthesia in more prolonged operations -- gastric resections, etc.

Basically, we used barbiturates as the sole form of anesthesia, combining them with ether ~~in essential cases~~ when necessary.

Altogether we carried out 614 operations with intravenous barbiturate anesthesia, and in a majority of cases (458 operations) we used only this ~~preparation~~ type of substances without combination with other anesthetizing or narcotizing substances. In 144 operations barbiturates were used ~~as a narcotic-base~~ for basal narcosis together with ether. And, finally, only 12 operations were carried out with an initial use of local anesthesia ~~with~~ followed by a subsequent transition, during the course of the operation, to intravenous barbiturate injection.

The doses and concentrations of the barbituric acid derivatives that we used were as follows: hexenal, hexenastab and evipan were injected in the form of ten percent solutions with no more than one gram of pure preparation; the concentration of the pentothal solutions was no more than 2.5 percent, while the maximum dose of pure preparation was basically one gram except in special cases, during more prolonged operations, where it reached 1.5 - 2 grams. The literature contains references to the use of five percent solutions of pentothal (Dedova, Otstavnova and others) and elevations of the maximum dose to 2.5 - 3.5 - 4 grams (Matrosov, Kurtiss, Davison and others). Noting the important fact that five percent solutions of pentothal are more toxic, and thus require more safeguards, and knowing of several cases in the literature where thrombosis occurred in the veins with the use of solutions of this concentration, we used the 2.5 percent concentration exclusively.

Since diseases of the liver are a counter-indication for the use of barbiturates, we only used this form of narcosis in eight cases of liver disease, applying it with great care and extending the injection period, and then only with diseases having a non-extended course without jaundice or other clinical symptoms of hepatitis. Still in one case complications did develop which will be mentioned below.

The distribution of the 458 operations carried out solely with intravenous barbiturate anesthesia, according to the type of preparation we used, is apparent from the table above. [Table 1 on following page]

In 144 cases of operative intervention with the use of barbiturates as a narcotic-base, we added ether only; the quantity of the

TABLE 1

Operation	Total	Form of Barbiturate			
		hexenal	pentothal	hexenastab	evipan
Appendectomy	26	8	9	6	3
Exploratory laporatomy	29	8	12	7	2
Gastric resection	7	1	5	1	-
Gastro-entero-anastomosis	24	5	13	3	3
Resection of the large and small intestines	5	1	4	-	-
Suturing of perforated ulcers of the stomach and duodenum	29	7	14	6	2
Amputation of extremities, sequestrotomy	51	15	19	13	4
Thoracotomy, thoracoplasty, closing of bronchial fistulas*	98	27	49	19	3
Amputation or ablation of mammary glands	36	9	14	9	4
Nephrectomy, pyelotomy	12	3	5	3	1
Prostatectomy, high sections of the bladder	19	9	4	2	4
Hernia-~~repair~~ section	29	7	13	9	-
Exposure of abcesses, phlegmons, mastitis	82	22	32	17	11
Removal of ovarian cysts	4	1	3	-	-
Removal of the spleen	3	-	3	-	-
Operations on the liver, and gall pathways Lucas	4	-	2	1	1
TOTAL	458	123	201	96	38

* A part of these operations was carried out in hospitals.

latter depended on the character of the operations and varied basically between twenty to forty grams. With this type of narcosis combination there was no observed serious complication either while falling asleep or waking up.

The patients subject to operative intervention varied in age from fifteen to sixty-five years and were distributed as follows:

Age	Number of cases	
16-20 years	48	
21-30 "	129	
31-40 "	204	There were 378
41-50 "	212	men and 236 women.
51-60 "	17	
over 60 "	4	

It should be noted that strict dosage of the preparations and particularly strict observation during their injection, with obligatory consideration of individual peculiarities of the patients, helps to avoid complications. A disruption of dosage, duration or tempo of injection, or use without consideration of the peculiarities of one or another patient, may cause complications. The first of these complications that should be mentioned is an inhibition of respiration, cyanosis with subsequent asphyxia, increased pulse rate, light convulsive tremors of the body, followed by a radical relaxation of the whole musculature. In the administration of anesthesia, we observed in some cases a brief stoppage of breathing, which quickly resumed after a pause in the injection of the barbiturate and breathing of oxygen. In seven cases these effects appeared much more sharply; in order to eliminate them it

was necessary to stop intravenous injection of barbiturate and change to another form of anesthesia. In these seven cases complications occurred once with hexenal, three times with the use of hexenastab and three times with the injection of evipan. No complications were observed with the use of pentothal.

All the complications we observed occurred either in the seriously ill, with chronic, extended pathology, or in individuals of advanced age. The injection of the first portions of hexenal solution caused complications in a patient, age 28, with a chronic osteomyelitis of the hip that had lasted four years. The injection of hexenastab led to complications in two emaciated patients with chronic emphysema of the thorax of over a year's duration, and in one patient suffering with endarteritis for six years. With evipan anesthesia complications also occurred in three cases: in a patient 41 years old with a chronic osteomyelitis of the hip of 14 years duration; in an old man of 64 years with an attempt to remove the prostate gland, and, finally, in a sick woman of 38 years, ill with cholecystitis with stones and edema of the gallbladder. We began the administration of evipan in the latter patient very carefully and with strict observation, but from the first second after the injection of only 0.3 of evipan (1:10) there was a pallor of the face, followed by a progressive cyanosis, light tremors of the whole body and brief stoppages of breathing. When we stopped the injection of evipan and gave the patient oxygen all the effects disappeared. The operation was carried out by us subsequently with the use of ether anesthesia and was concluded successfully. The patient recovered.

We did not observe any fatalities as a result of intravenous barbiturate anesthesia.

The patients awoke very quickly after the operation; the awakening was quiet without any secondary reactions. In individual patients the sleep lasted longer than usual and continued for one to two hours after the operation, which has been noted by other authors (Matrosov, Zhorov, Davison) who observed extended sleep after the operation for four and even more than twelve hours.

With respect to the extent and intensity of barbiturate action on the blood pressure, according to our observations, barbiturates do not cause sharp changes in the blood pressure, and if they occur they are of insignificant magnitude and are present only with the initial injection of the barbiturate, most often -- with too rapid injection (overdosage according to time).

SUMMARY

1. Intravenous barbiturate anesthesia gives a quiet sleep with a quick onset, without excitement either when falling asleep or awakening. Following the loss of sensitivity there is a good relaxation of the trunk and extremity musculature, which favors the carrying out of surgical intervention.

2. The intravenous administration of barbiturates should be alternated with the injection of forty percent glucose, which leads to a quieter and more normal condition of the patient.

3. There are counter-indications to the use of barbituric acid derivatives with greatly emaciated patients, pathology of the respiratory organs or liver, and also ~~with an age~~ when the age is over sixty years.

4. The best preparation for effectiveness, soft sleep and a minimum number of complications, is pentothal, which is less toxic and causes less inhibition of the respiratory center.

5. In administering intravenous barbiturates, the anesthetist must make sure that there is a good ~~provision~~ supply of air to the patient's respiratory system, and always be aware of the ~~case of~~ fact that overdosage may easily occur, which constitutes the greatest danger (Zhorov).